

WHAT IS CLAIMED IS:

1. A method of tracking and predicting the capacity utilization of a goods delivery system, the system having at least one delivery zone, each delivery zone having a capacity utilization matrix comprising a plurality of slots, the goods delivery system providing a respective first potential delivery date, a respective order, and the number of slots the respective order will fill, said method of tracking capacity utilization comprising the steps of:

getting a respective zone maximum and a respective number of used slots for a specified period of time within the respective delivery zone;

determining whether the respective order can be shipped on the first potential ship date based on the number of available slots, wherein said respective number of available slots is equal to said respective zone maximum minus said respective number of used slots;

returning a respective date that the respective order can be delivered; and

updating the respective capacity utilization matrix for the above specified period after the respective order has been included within said respective number of used slots.

2. The method of tracking capacity as recited in claim 1, wherein the step of updating the respective capacity utilization matrix further comprises the step of calculating the workload utilization and storing the result in a workload value for each of said respective slots within the delivery zone.

3. The method of tracking capacity as recited in claim 1, wherein the step of calculating the capacity utilization comprises the step of calculating said respective workload value, wherein said respective workload value = (last workload value + (number of filled slots) ÷ (zip group maximum)).

4. The method of tracking capacity utilization as recited in claim 3, further comprising the step of setting a respective capacity signal when an over capacity condition and an under capacity condition has been detected.

5. The method of tracking capacity utilization as recited in claim 4, comprising the step of setting a respective over capacity flag after determining that the sum of a set of said preselected workload values are greater than a predetermined over capacity value over a historical period.

6. The method of tracking capacity utilization as recited in claim 5, wherein said predetermined over capacity value is about 700 percent and wherein said historical period is the previous ten days and wherein said over capacity value is a workload greater than or equal to 100 percent.

7. The method of tracking capacity utilization as recited in claim 4, comprising the step of setting a respective under capacity flag after determining that said set of preselected workload values are each less than a predetermined under capacity value over a historical period.

8. The method of tracking capacity utilization as recited in claim 7, wherein said preselected workload value is a workload value less than about 50 percent and wherein said historical period is the previous ten days.

9. The method of tracking capacity utilization as recited in claim 1, further comprising the step of predicting the probability of a future respective used slot being full based on historical over capacity conditions.

10. The method of tracking capacity utilization as recited in claim 9, wherein the step of predicting the probability of a future respective used slot being full further comprises the steps of:

obtaining the workload values for a predetermined period of time; and

determining the probability that the next used slot will meet an over capacity condition using a distribution function;

wherein said over capacity condition is defined as the state when the workload value is greater than or equal to 100 percent.

11. The method of tracking capacity utilization as recited in claim 1, further comprising the step of predicting whether the trend line of the capacity utilization is changing.

12. The method of tracking capacity utilization as recited in claim 11, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is increasing when the slope of the regression line for a first fixed period of workload values is greater than zero, within a predetermined confidence interval.

13. The method of tracking capacity utilization as recited in claim 11, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is decreasing when the slope of the regression line for a first fixed period of workload values is less than zero, within a predetermined confidence interval.

14. The method of tracking capacity utilization as recited in claim 12, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

15. The method of tracking capacity utilization as recited in claim 13, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

16. The method of tracking capacity as recited in claim 1, wherein said specified period of time is thirty days.

17. A computer program storage medium readable by a computer system and encoding a computer program of instructions for executing a computer process for tracking and predicting the capacity utilization of a goods delivery system, the system having at least one delivery zone, each delivery zone having a capacity utilization matrix comprising a plurality of slots, the goods delivery system providing a respective first potential delivery date, a respective order, and the number of slots the respective order will fill, said computer process comprising the steps of:

getting a respective zone maximum and a respective number of used slots for a specified period of time within the respective delivery zone;

determining whether the respective order can be shipped on the first potential ship date based on the number of available slots, wherein said respective number of available slots is equal to said respective zone maximum minus said respective number of used slots;

returning a respective date that the respective order can be delivered; and

updating the respective capacity utilization matrix for the above specified period after the respective order has been included within said respective number of used slots.

18. The computer process as recited in claim 17, wherein the step of updating the respective capacity utilization matrix further comprises the step of calculating the workload utilization and storing the result in a workload value for each of said respective slots within the delivery zone.

19. The computer process as recited in claim 17, wherein the step of calculating the capacity utilization comprises the step of calculating said respective workload value, wherein said respective workload value = (last workload value + (number of filled slots) ÷ (zip group maximum)).

20. The computer process as recited in claim 19, further comprising the step of setting a respective capacity signal when an over capacity condition and an under capacity condition has been detected.

21. The computer process as recited in claim 20, comprising the step of setting a respective over capacity flag after determining that the sum of a set of said preselected workload values are greater than a predetermined over capacity value over a historical period.

22. The computer process as recited in claim 21, wherein said predetermined over capacity value is about 700 percent and wherein said historical period is the previous ten days and wherein said over capacity value is a workload greater than or equal to 100 percent.

23. The computer process as recited in claim 21, comprising the step of setting a respective under capacity flag after determining that said set of preselected workload values are each less than a predetermined under capacity value over a historical period.

24. The computer process as recited in claim 23, wherein said preselected workload value is a workload value less than about 50 percent and wherein said historical period is the previous ten days.

25. The computer process as recited in claim 17, further comprising the step of predicting the probability of a future respective used slot being full based on historical over capacity conditions.

26. The computer process as recited in claim 25, wherein the step of predicting the probability of a future respective used slot being full further comprises the steps of:

obtaining the workload values for a predetermined period of time; and

determining the probability that the next used slot will meet an over capacity condition using a distribution function;

wherein said over capacity condition is defined as the state when the workload value is greater than or equal to 100 percent.

27. The computer process as recited in claim 17, further comprising the step of predicting whether the trend line of the capacity utilization is changing.

5 28. The computer process as recited in claim 27, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is increasing when the slope of the regression line for a first fixed period of workload values is greater than zero, within a predetermined confidence interval.

10 29. The computer process as recited in claim 27, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is decreasing when the slope of the regression line for a first fixed period of workload values is less than zero, within a predetermined confidence interval.

15 30. The computer process as recited in claim 28, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

31. The computer process as recited in claim 29, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

20 32. The computer process as recited in claim 17, wherein said specified period of time is thirty days.

33. A method of tracking and predicting the capacity utilization of a goods delivery system, the system having at least one delivery zone, each delivery zone having a capacity utilization matrix comprising a plurality of slots, the goods delivery system providing a respective first potential delivery date based on a selected potential ship

date, a respective order, and the number of slots the respective order will fill, said method of tracking capacity utilization comprising the steps of:

getting a respective zone maximum and a respective number of used slots for a specified period of time within the respective delivery zone;

5 determining whether the respective order can be shipped on each day of a set potential ship dates based on the number of available slots, wherein said respective number of available slots is equal to said respective zone maximum minus said respective number of used slots;

wherein said set of potential ship dates includes the respective dates from the selected potential ship date to the first determined potential ship date;

returning an indication of the respective dates that the respective order can be delivered within said set of potential ship dates; and

updating the respective capacity utilization matrix for the above specified period after the respective order has been included within said respective number of
15 used slots.

34. The method of tracking capacity as recited in claim 33, wherein the step of updating the respective capacity utilization matrix further comprises the step of calculating the workload utilization and storing the result in a workload value for each of said respective slots within the delivery zone.

20 35. The method of tracking capacity as recited in claim 33, wherein the step of calculating the capacity utilization comprises the step of calculating said respective workload value, wherein said respective workload value = (last workload value + (number of filled slots) ÷ (zip group maximum)).

25 36. The method of tracking capacity utilization as recited in claim 35, further comprising the step of setting a respective capacity signal when an over capacity condition and an under capacity condition has been detected.

37. The method of tracking capacity utilization as recited in claim 36, comprising the step of setting a respective over capacity flag after determining that the sum of a set of said preselected workload values are greater than a predetermined over capacity value over a historical period.

5 38. The method of tracking capacity utilization as recited in claim 37, wherein said predetermined over capacity value is about 700 percent and wherein said historical period is the previous ten days and wherein said over capacity value is a workload ~~greater than or equal to 100 percent.~~

10 39. The method of tracking capacity utilization as recited in claim 36, comprising the step of setting a respective under capacity flag after determining that said set of preselected workload values are each less than a predetermined under capacity value over a historical period.

15 40. The method of tracking capacity utilization as recited in claim 39, wherein said preselected workload value is a workload value less than about 50 percent and wherein said historical period is the previous ten days.

20 41. A method of predicting the capacity utilization of a goods delivery system, the system having at least one delivery zone, each delivery zone having a capacity utilization matrix comprising a plurality of slots each slot having an associated workload value, said method of predicting the capacity utilization comprising the steps of:

predicting the probability of a future respective used slot being full based on historical over capacity conditions; and

predicting whether the trend line of the capacity utilization is changing.

25 42. The method of predicting capacity utilization as recited in claim 41, wherein the step of predicting the probability of a future respective used slot being full comprises the steps of :

obtaining the workload values for a predetermined period of time; and

determining the probability that the next used slot will meet an over capacity condition using a distribution function;

5 wherein said over capacity condition is defined as the state when the workload value is greater than or equal to 100 percent.

43. The method of predicting capacity utilization as recited in claim 41, further comprising the step of predicting whether the trend line of the capacity utilization is changing.

10 44. The method of predicting capacity utilization as recited in claim 43, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is increasing when the slope of a regression line for a first fixed period of workload values is greater than zero, within a predetermined confidence interval.

15 45. The method of predicting capacity utilization as recited in claim 43, wherein the step of predicting future capacity utilization further comprises the step of determining that the trend line of the capacity utilization is decreasing when the slope of a regression line for a first fixed period of workload values is less than zero, within a predetermined confidence interval.

20 46. The method of predicting capacity utilization as recited in claim 44, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

47. The method of predicting capacity utilization as recited in claim 45, wherein said first fixed period is seven days and said predetermined confidence interval is about 95 percent.

48. The method of predicting capacity utilization as recited in claim 42, wherein
said specified period of time is thirty days.